and control plane Radio Resource Control (RRC) protocol terminations towards the communication devices. Other examples of radio access system include those provided by base stations of systems that are based on technologies such as wireless local area network (WLAN) and/or WiMax (Worldwide Interoperability for Microwave Access).

[0068] Some embodiments may be used with LTE (or LTE-Advanced) co-channel deployment of macro eNBs and low power eNBs in the form of RRHs. Alternatively or additionally embodiments may be used with smaller cells such as pico or femto cells and/or other relay stations. The smaller cells and/or relay stations may be in communication with a macro eNB. One example of is a co-channel LTE HetNet scenario. This may arise where more than one transmitter is using the same channel or frequency. Some embodiments may address the problem of joint multi-cell packet scheduling for the downlink of such a system, while still maintaining fairness among all users.

[0069] As discussed herein studies on the radio access network (RAN) aspects of Machine-Type and other mobile data applications communications enhancements, have resulted in candidate solutions for UE power consumption optimization by configuring a much longer discontinuous reception (DRX) cycle in idle mode. In other words defining an extended paging cycle to the UE and therefore enabling the UE a longer "sleep" time period and lower power consumption.

[0070] In such situations a user equipment (UE) or suitable mobile communications device could apply discontinuous reception (DRX) in idle mode to receive paging periodically for power saving. The subframes where the UE listens to the paging channel are calculated based on the UE identity and paging related parameters advertised in system information.

[0071] While the paging message is used to deliver the paging record for respective UEs, the change of system information is also indicated by the paging message. If the UE receives a Paging message including a system information modification indicator, for example a 'systemInfoModification' indicator then the UE determines that the system information will change at the next modification period boundary and can be configured to acquire the new system information immediately from the start of the next modification period.

[0072] For example in FIG. **6** an example broadcast control channel (BCCH) timeline is shown with two modification periods, a (n) modification period **601** and a succeeding (n+1) modification period **603**. Within the (n) modification period **601** the control apparatus broadcasts system information to the UEs operating within the current cell or network access point, this system information is shown by blocks **609** and **611**. Similarly within the (n+1) modification period **603** the control apparatus broadcasts system information to the UEs operating within the current cell or network access point, this system information is shown by blocks **613** and **615**. From this figure, block **613** is different from block **609** which means the system information has been changed.

[0073] When the network or control apparatus decides to change the system information, an system information modification indicator, for example a 'systemInfoModification' indicator is configured to be added to all paging messages during BCCH modification period (n). The network or control apparatus can then be configured to send the updated information in the succeeding modification period, which in FIG. **6** is the BCCH modification period (n+1) **603**. The paging information respective to certain UE is shown in FIG. **6** by the paging arrows **607**. The paging information is typically sent several times in one modification period which is defined by a repetition or paging cycle or period **605**. In FIG. **6** the paging cycle is such that there are 4 pages within the modification period. This is the result of a relationship of modification period =N*paging cycle where in the example shown in FIG. **6** N=4.

[0074] There is a possible problem or issue with the current proposed extended DRX cycle when applied to idle mode in that it is likely that the UE would miss the system information change indication during the whole BCCH modification period (n) because of the very long sleep time. In such situations the UE does not keep the latest system information which may impact the UE from being able to access the network and therefore degrade the system performance. This for example is shown in FIG. **6** by the second, lower, timing line which shows the distance between UE consecutive active periods **621** and **623** being greater than the extended paging cycle **625**.

[0075] It has been proposed to overcome the problem with by extending the BCCH modification period by replacing the default paging cycle with an extended paging cycle.

[0076] In other words

BCCH modification period (# radio frames)
=modificationPeriodCoeff*extendedPagingCycle.

[0077] However as the updated system information would not be sent until the next system information block (SIB) modification period, the extension of the modification period would increase the time period to update the system information and which would impact the performance of UEs not applying extended paging cycle.

[0078] A further proposal has been to always acquire system information before paging occasions. This ensures that the UE could acquire the latest system information, however this option is at the cost of more power consumption. For example especially when the system information does not change frequently, it is not necessary to read system information before every paging occasion. Considering the initial intention of an extended DRX cycle is to save power, it would be inefficient to mandate system information block (SIB) reading in this way.

[0079] The concept as applied in embodiments described herein is to define a solution where:

[0080] 1) The UE acquires the system information block (SIB) only when it does change.

[0081] 2) The solution shall not impact the system information change of normal UEs.

[0082] The concept as applied in embodiments described herein is therefore to configure the network, such as controlled by the control apparatus to indicate the change of system information block (SIB) for the user equipment configured with extended paging cycle using a dedicated indicator or indication within the paging message. Based on the combination of current system information modification indicators and the proposed indicator the user equipment can be configured to determine whether to acquire the system information at the next modification period boundary and/or immediately.

[0083] With respect to FIG. **4** a flow diagram shows the operation of the control apparatus according to a first set of embodiments. Furthermore with respect to FIG. **7** a timing diagram shows the application of an extended system information modification indicator according to some embodiments as generated by the control apparatus operating according to the method shown in FIG. **4**.